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Appendix B

Sample IPQMS Checklist

PUBLIC WORKS PROJECTS

The authors and their colleagues developed approximately 260 questions as the basis for researching and writing case histories of past projects to establish a data base for the lessons learned to improve planning and management of new projects. These questions can also be adapted to provide a sound basis for troubleshooting any problems that might arise in design and implementation of projects in all sectors.

This appendix demonstrates the application of the comprehensive set of IPQMS questions in preparing a sample checklist for public works and other construction projects. A similar checklist of questions can be prepared for any program or project in any sector, public or private. For example, a checklist of questions prepared for the Challenger program could have prevented the Challenger spacecraft disaster in January 1986 by providing unified control of the design of the pressure seal in the aft field joint of the right solid rocket motor. Additional examples of the value of a checklist of questions to ensure cost effectiveness and safety can be provided.

The following sample checklist for public works and other construction projects is prepared by project phase (see [Figure 2.1](#)):

A. Phase 1: Planning, Appraisal and Design

1. Prepare purposes and goals of project.
 - a) Clarity of project statement
 - b) Identification of potential problem areas in design, manpower needs, financial needs and timetables
2. Extent of preliminary design
 - a) Manpower needs for preparation
 - b) Reliability of design data and assumptions
3. Selection of overall project manager (or project management team) who will have responsibility and accountability for entire project.

4. Detailed layout of feasibility studies and analyses to determine if available resources (financial, manpower, materials, technological) are adequate to ensure a successful project. These studies also provide necessary baseline data for subsequent tasks.
 - a) The technical feasibility studies (project location and layout, subsurface conditions and problem areas, technology needs, availability of construction materials, training of technical personnel, labor market, water supply needs, waste treatment requirements)
 - b) The financial feasibility analysis (investment analysis, projected capital needs at various stages)
 - c) The economic feasibility analysis (local economic benefits, cost-benefit studies of alternative designs, effect on employment)
 - d) The market and commercial feasibility studies (as appropriate)
 - e) The administrative, organizational, and managerial studies
 - f) The environmental baseline studies
 - g) The environmental impact studies (estimate impact of proposed project, both short- and long-term)
 - h) The social and political impact studies
5. Outline procedures to be used for the appraisal process.
 - a) Determine how many stages the process should go through
 - b) Have the appraisal team make necessary on-site inspections
6. The final design should clearly and explicitly satisfy the purposes and goals of the project.
 - a) Alternative designs should be considered as appropriate
7. The final design must include measurable targets for attaining purposes and goals (measuring the project's outputs).
 - a) Relevant building codes must be satisfied
 - b) Provisions must be made for environmental impact assessments
8. Plans, specifications, job descriptions and work schedules must be prepared in detail.
9. Provisions must be made for continuous evaluation of each task, also serving as the basis for a post-evaluation plan.

10. Baseline data obtained from the feasibility studies should now be organized to prepare guidelines and checklists for both control criteria for subsequent tasks in the IPQMS and troubleshooting any problems that might arise.

B. Phase 2: Selection, Approval, and Activation

1. The final selection and approval of the project design must include a final financial plan for funding of the project, with assurances that budgets and timetables are coordinated.
2. Outline the necessary linkages with the various agencies and civic groups interested in, and concerned with, the project.
3. The overall project manager must carefully review all project tasks in light of personnel needs, position descriptions, and budgets to organize the project internally.
4. A preliminary control system such as the critical path method (CPM) or the program evaluation and review technique (PERT) is now prepared and approved by the overall project manager. This must include:
 - a) Work/activity scheduling
 - b) Authority, responsibility, and supervision
 - c) Communication channels among divisions and with supporting organizations
 - d) Relationships between technical and administrative divisions
 - e) Resource procurement and allocation
 - f) Monitoring and reporting
 - g) Public participation, as appropriate
5. Anticipate the possible need for on-the-job training for a select number of persons, who will assume more responsibility on future projects.

C. Phase 3: Operation, Control and Handover

1. Be prepared for intense activities as the various tasks and functions become operational in the start-up of the project.
2. The overall project manager must review the control system (CPM or PERT), and adjust if necessary to optimize coordination and control of the many diverse operations.

- a) The flow of necessary resources
 - b) The viability of information flows and feedback systems
 - c) The ability to troubleshoot any problems that might arise: personnel, technical or financial
- 3. Responsibility for on-going evaluation of each task with weekly (or daily if necessary) meetings with the overall project manager to assure smooth operations. Any request for changes in construction must be carefully checked to ensure safety and timetables are maintained.
- 4. Have a plan for a smooth handover of the project to its owner or administrator, with arrangements to transfer unutilized or excess resources to other projects or organizations.
- 5. Project completion report.

D. Phase 4: Evaluation and Refinement

- 1. Prepare an evaluation report consisting of the on-going evaluations in phases 1 to 3, and a post-completion evaluation.
 - a) Include evaluation parameters developed from the feasibility studies (phase 1)
 - b) Measure and analyze the difference between projected and actual results
- 2. Will the evaluation results lead to the formulation of proposals for further projects?
- 3. What lessons and insights were learned from the project?
 - a) Was there an analysis of the reasons for deviations in implementation from the operating plan?
 - b) Did the analysis reveal both long- and short-term lessons?
- 4. How can these lessons be applied to refine future projects?
- 5. How can these lessons be applied to future policy decisions on project management?
- 6. How can these lessons be used to ensure total quality and cost effectiveness in all future programs and projects?
- 7. How can these lessons be utilized in project management education and training?

As stated earlier, the IPQMS provides a dynamic and holistic approach to management which considers the entire range of a program or project's activities, from planning through implementation, evaluation, and refinement, with the central function of policy providing focus and direction throughout the life (and afterlife) of the project. Thus, it serves as a basis for organizing all project teams to provide the necessary leadership, teamwork, and information flows for accountability, cost effectiveness, and quality. Of equal importance, it provides the framework for improved project management education and training.

Initially, the IPQMS was found very effective for engineering and public works projects for which the various components and stages are well defined. Thus, check-lists corresponding to each of the components are prepared in detail and can be evaluated at any time during the cycle. Our continuing studies show that the IPQMS can also be used in other areas such as agriculture, health, industry — indeed in every aspect of government and the private sector. The authors and a colleague have prepared a draft of an IPQMS Checklist for the EPA Superfund Program.

As discussed in [Chapter 2](#), the IPQMS is a powerful management tool. It provides solutions to complex problems of people, organizations, finance, materials, and time — facilitating decision-making and eliminating problems that might arise during implementation.

With the advent of very efficient computer systems, the IPQMS becomes doubly easy to use. Warning indicators can be introduced so that projects, when something goes wrong, can be corrected on time. Graft, or overspending, can easily be pinpointed in all areas, and waste will be minimized. Mismanagement will be identified as soon as it happens and thus curtailed. An IPQMS-run project is a fail-safe project.